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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
ZHEN, LI B

ART UNIT	PAPER NUMBER
2151	7

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/217,389	Applicant(s) SUCH, ONDREJ	
	Examiner Li B. Zhen	Art Unit 2151	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 July 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1 – 4 and 6 – 20 rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,797,004 to Lindholm in view of U.S. Patent No. 6,237,043 to Brown.

As to claims 1, 17, and 19 Lindholm teaches (column 2, lines 7 – 39 and 60 – 65) a system comprising at least one thread (a group of threads), a pool of locks (cache of synchronization construct), at least one object that is capable of representing a resource needed by the at least one thread (a set of objects that can each can only be synchronized with a predefined number of the threads at a time), the at least one object having a variable (inherent for objects to have variables), a recyclable locking mechanism (object synchronization module) for associating a lock from the pool of locks with the at least one object (allocates the respective synchronization construct to the respective object), and the lock returning to the pool without having to destroy the at least one object when the at least one thread no longer needs to access the resource (when a specific thread seeks de-synchronization with a specific object...de-allocates the specific synchronization construct and returns the specific synchronization construct to the free list). As to using the variable of the object as a pointer to associate an object

with a lock, Lindholm teaches (column 2, lines 15 – 23) using a variable (object identifier) to associate an object with a lock, but the variable of Lindholm is stored in the lock.

In object-oriented programming, association between two objects can be achieved in multiple ways. A first object can contain a pointer to a second object or the second object can contain a pointer to the first object or both of the objects can contain pointers to each other. For example, Brown teaches (column 3, lines 57 – 61; column 4, lines 9 – 11) associating a lock with an object using the variable of the object as a pointer to the lock (locking mechanism is bound to an object...which contain...a pointer to a locking mechanism). Therefore, it would have been obvious to apply the teaching of using a variable of the object as a pointer to the lock as taught by Brown to the invention of Lindholm because there are multiple ways to associate objects.

As to claim 2, Lindholm teaches (column 7, lines 20 – 40) deassocaite the lock from the object (de-synchronization of Objects when Synchronization is Completed) upon a second request (synchronization method invokes the cache manager 126, step 302 of Fig. 3) by the thread.

As to claim 3, Lindholm as modified teaches (column 7, lines 39 – 50 of Brown) an associated variable that comprises an integer (locking address 130, Fig. 4).

As to claim 11, this is a method claim that corresponds to system claim 1 with the addition increasing a variable of the object, a set of high bits for representing a pointer to a lock, a set of low bits for representing a lock status, and determining whether the variable is greater than a boundary values so as to allocate the lock. Lindholm as

modified teaches (column 7, lines 24 – 28 and 39 – 50; column 9, lines 20 – 30 of Brown) increasing a variable of the object (TakeLock is incremented), a set of high bits (locking address 130, Fig. 4) for representing a pointer to a lock (pointer or index), a set of low bits for representing a lock status ("H" bit 128, and "A" bit 114, Fig. 4), and determining whether the variable is greater than a boundary values so as to allocate the lock (If the "H" bit is equal to one).

As to claim 12, Lindholm as modified teaches (column 7, lines 24 – 28 of Brown) that the set of low bits (TakeLock) equal to –1 when the lock is not taken. However, Lindholm as modified does not disclose the initial value of the set of low bits. Obviously when the lock is first created, it would not have been assigned to any object yet and the initial value of the set of low bits would equal to –1.

As to claim 13, Lindholm as modified teaches (column 9, lines 20 – 40 of Brown) determining associated variable is less than boundary value ('H' bit is equal to one). The associated variable would not point to a lock if the condition described above were true. Obviously the method would wait until condition is false ('H' bit is equal to zero) before using the variable as a pointer.

As to claim 14, Lindholm as modified teaches (column 9, lines 20 – 40 of Brown) determining associated variable is greater than boundary value ('H' bit is equal to 0, step 206, Fig. 7) and using the set of high bits as a pointer to a lock (step 226, Fig. 7).

As to claims 4, 18, and 20, Lindholm as modified teaches (column 7, lines 13 – 28, 39 – 50, and 65 – 67; column 8, lines 1 – 6 of Brown) a set of high bits (locking

address 130, Fig. 4) defining the pointer (a pointer or index) to a lock and a set of low bits (TakeLock 122 and 'H' bit 128, Fig. 3) defining a status variable.

As to claim 6, this is a system claim that corresponds to method claim 12; note the rejection of claim 12 above, which also meets the system claim.

As to claim 7, Lindholm as modified teaches (column 7, lines 24 – 28 of Brown) incrementing the set of low bits (TakeLock) upon first request (new thread requests lock on an object).

As to claim 8, Lindholm as modified teaches (column 7, lines 24 – 28 and lines 40 – 45 of Brown) an in-use status (TakeLock greater than or equal to 0) and the set of high bits (locking address) points to a lock.

As to claims 9, Lindholm as modified teaches (column 9, lines 20 – 40 of Brown) a spin-status ('H' bit is equal to one) such that the set of high bits is in the process of being set to a lock (determine and store next available locking mechanism in object's header, step 208 – 214, Fig. 7).

As to claim 10, Lindholm as modified teaches (column 7, lines 24 – 28 of Brown) decrementing the set of low bits (TakeLock) upon second request (thread unlocks an object).

As to claims 15 and 16, Lindholm teaches (column 7, lines 63 – 67; column 8, lines 1 – 6) recycling (de-allocate and return to free list) the lock (synchronization construct) when associated variable is less than threshold (waiters list and synchronizers list are both empty).

3. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lindholm in view of Brown further in view U.S. Patent No. 5,687,073 to Kishimoto.

As to claim 5, Lindholm as modified does not teach the set of high bits comprises 27 bits and the set of low bits comprises 5 bits.

However, Kishimoto teaches (column 7, lines 12 – 26) the set of high bits comprises 27 bits (higher 27 bits) and the set of low bits comprises 5 bits (lower 5 bits).

It would have been obvious to apply designating 27 bits for the set of high bits and 5 bits for the set of low bits as taught by Kishimoto to the invention of Lindholm as modified because it would only require one 32-bit word to store both the set of high and low bits and reduce memory usage.

Response to Arguments

4. The applicant argues (p. 11, lines 5 – 9 and 14 – 17) "the locking mechanism of Brown et al. remains bound to the object for the life of the object". Please refer to the rejection of the independent claims above.

The applicant argues (p. 12, lines 14 – 20) "O'Connor fails to teach the ability of recycling a lock by returning the lock to a pool when a thread no longer needs an object that was secured by the lock." The examiner agrees with the argument, but O'Connor was not relied upon to provide the limitation recited above. Instead O'Connor was used to teach that a variable that can be used to store both a pointer and status. Upon further consideration, the O'Connor reference is probably not necessary because Brown teaches (column 7, lines 39 – 50) a variable used to store both a pointer (locking

address 130, Fig. 4) and for representing a lock status ("H" bit 128, and "A" bit 114, Fig. 4), see the rejection above.

The applicant appears to argue (p. 13, lines 17 – 19) that Kishimoto does not teach providing recyclable locks. Kishimoto was not provided to teach recyclable locks. The Kishimoto reference was relied upon to provide the teaching that the set of high bits can be 27 bits and the set of low bits can be 5 bits, see the rejection above.

The applicant argues (p. 14, lines 19 – 20), "Lindholm et al. lack a variable that can be used as a pointer to a lock object and/or be used to indicate the lock status". While that may be true, Brown teaches (column 7, lines 39 – 50) a variable that can be used as a pointer to a lock object and/or be used to indicate the lock status. Both Lindholm and Brown teach the use of a lock object to synchronize thread access to a resource object. Therefore, the Brown reference is used in combination with the Lindholm reference, see the rejection above.

Applicant argues (p. 15, lines 18 – 20) "Lindholm et al. uses specialized methods to synchronize whereas applicant's invention synchronizes objects by the use of simple variable." The examiner disagrees because Lindholm uses lock objects (synchronization constructs) to synchronize. As to the applicant's claim that applicant's invention synchronizes objects by the use of simple variables, the examiner disagrees. As best understood by the examiner, the claimed invention recites using locks to synchronize objects, not the simple variables. The variables are used to associate locks with resource objects.

The applicant appears to argue (p. 16, lines 1 – 5) that Lindholm uses a cache of monitors for synchronizing objects, but Brown criticize the use of a cache of monitors. The examiner disagrees because Lindholm teaches (column 2, lines 15 – 23) using a cache of synchronization constructs to synchronizing objects. Lindholm teaches (column 2, lines 24 – 31) allocating a synchronization construct for to synchronize an object when no monitor is allocated to synchronize the object. Even if Lindholm teaches the use of monitors, it should be noted that the Brown reference is used to provide the teaching of associating a lock to a resource object using a variable in the resource object as a pointer and the examiner is not trying to combine a system that uses monitors to synchronize objects with a system that does not use monitors to synchronize objects.

Applicant argues (p. 16, lines 15 – 19) see the rejection to claim 1 above.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Li B. Zhen whose telephone number is (703) 305-3406. The examiner can normally be reached on Mon - Fri, 8am - 4:30pm.

The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-7239 for regular communications and (703) 746-7238 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Li B. Zhen
Examiner
Art Unit 2151

lbz
September 20, 2002

ST. JOHN COURTENAY III
PRIMARY EXAMINER